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Issued November 30, 1907.

U. S. DEPARTMENT OF AGRICULTURE,

FOREST SERVICE—Circular 124.

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(IN COOPERATION WITH THE DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF THE CENSUS, S. N. D. NORTH, Director.)

CONSUMPTION OF CROSS-TIES IN 1906.

15602—No. 124—07

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1907

Previous to 1905, statistics upon the production of lumber and timber products were collected by the Bureau of the Census in connection with the decennial and quinquennial censuses of manufactures. To satisfy the urgent demand for more frequent reports upon these important products, the Forest Service collected statistics of the production in 1905. In order to avoid duplication of work and to insure uniformity of results, the Bureau of the Census and the Forest Service arranged in 1906 to cooperate in the preparation of annual statistics of forest products.

The collection and compilation of the statistics of production in 1906, therefore, have been under the direct supervision of W. M. Steuart, Chief Statistician for Manufactures, and J. E. Whelchel, Expert, Chief of Division, on the part of the Bureau of the Census; and R. S. Kellogg, Chief of the Office of Wood Utilization, and H. M. Hale, Forest Assistant, on the part of the Forest Service.

CONSUMPTION OF CROSS-TIES IN 1906.

The statements in this report are based on the number of ties bought rather than on the number actually used. For all practical purposes, however, the two are identical; because the purchases in twelve months are an accurate index of consumption for a corresponding period.

The purchases of cross-ties by steam and street railroads of the United States during the year 1906 amounted to 102,834,042, valued at $48,819,124, an average of 47 cents per tie. This value represents the cost to the purchaser at the point of purchase. In many, perhaps most, cases this point of purchase is the point of production, near the road's right of way; but in others, and this is particularly true of sawed pine ties, long shipments are involved and the point of purchase is a local distributing market, distant from the source of supply. The average value of 47 cents, therefore, probably represents a higher rate than that received by the producer. The steam railroads purchased 93,477,625 ties, or about nine-tenths of the whole number.

Street railways as a rule use a smaller, lighter tie than that required by the steam roads, so their material is less difficult to obtain.

KINDS OF WOODS USED.

Table 1 summarizes, by kinds of wood, the quantities of hewed and sawed ties purchased in 1906. Approximately one-fourth were sawed and three-fourths hewed.

TABLE 1.—*Cross-ties purchased by steam and street railroads in 1906.*

Kind of wood.	Total.	Hewed.	Sawed.
Oaks	45,357,874	38,269,030	7,088,844
Southern pines	18,841,210	13,745,716	5,095,494
Douglas fir	7,248,562	657,934	6,590,628
Cedar	7,083,442	5,429,305	1,654,137
Chestnut	6,588,975	5,450,920	1,138,055
Cypress	5,104,496	4,448,052	656,444
Western pine	3,969,605	1,884,096	2,085,509
Tamarack	2,576,859	2,360,873	215,986
Hemlock	2,058,198	1,928,726	129,472
Redwood	1,248,629	892,687	355,942
Lodgepole pine	554,738	554,738	....
White pine	373,387	278,270	95,117
All others	1,828,067	1,593,647	234,420
Total	102,834,042	77,493,994	25,340,048

Table 2 shows the quantity and value of hewed and sawed ties of various woods purchased by steam and street railroad companies in 1906. The average value of the sawed tie is higher than that of the hewed tie.

Table 2.—*Number and value of ties purchased by steam and street railroads of the United States in 1906.*

	Total.			Steam railroads.					
				Hewed.			Sawed.		
	Number.	Value.	Average value per tie.	Number.	Value.	Average value per tie.	Number.	Value.	Average value per tie.
Oaks	45,357,874	$23,278,052	$0.51	35,507,777	$17,583,827	$0.50	6,024,852	$3,672,691	$0.61
Southern pines	18,841,210	9,567,745	.51	12,851,239	6,311,585	.49	4,686,851	2,593,424	.55
Douglas fir	7,248,562	3,010,392	.42	631,939	220,331	.35	6,074,283	2,562,636	.42
Cedar	7,083,442	3,310,116	.47	4,940,337	2,334,675	.47	1,476,530	709,771	.48
Chestnut	6,588,975	2,995,942	.49	3,878,970	1,787,167	.46	767,793	345,817	.45
Cypress	5,104,496	1,862,135	.36	4,354,720	1,512,033	.35	633,865	301,467	.48
Western pine	3,969,605	1,698,027	.43	1,869,731	840,555	.45	2,039,769	832,804	.41
Tamarack	2,576,859	889,561	.35	2,340,050	795,803	.34	90,186	41,414	.46
Hemlock	2,058,198	582,968	.28	1,912,540	523,741	.27	124,462	53,155	.43
Redwood	1,248,629	536,172	.43	539,060	182,343	.34	186,286	66,501	.36
Lodgepole pine	554,738	210,818	.38	553,838	210,458	.38	....	....	....
White pine	373,387	151,052	.40	243,515	70,397	.29	14,515	6,436	.44
All others	1,828,067	726,144	.40	1,575,699	587,162	.37	158,818	74,339	.47
Total	102,834,042	48,819,124	.47	71,199,415	32,960,077	.46	22,278,210	11,260,455	.51

	Street railroads.					
	Hewed.			Sawed.		
	Number.	Value.	Average value per tie.	Number.	Value.	Average value per tie.
Oaks	2,761,253	$1,428,714	$0.52	1,063,992	$592,820	$0.56
Southern pines	894,477	438,180	.49	408,643	224,556	.55
Douglas fir	25,995	8,747	.34	516,345	218,678	.42
Cedar	488,968	194,238	.40	177,607	71,432	.40
Chestnut	1,571,950	701,301	.45	370,262	161,657	.44
Cypress	93,332	36,920	.40	22,579	11,715	.52
Western pine	14,365	4,641	.32	45,740	20,027	.44
Tamarack	20,823	7,394	.35	125,800	44,950	.36
Hemlock	16,186	4,532	.28	5,010	1,540	.31
Redwood	353,627	171,939	.49	169,656	115,389	.68
Lodgepole pine	900	360	.40	....	....	....
White pine	34,755	17,108	.49	80,602	57,111	.71
All others	17,948	8,437	.47	75,602	56,206	.74
Total	6,294,579	3,022,511	.48	3,061,838	1,576,081	.52

Oak, the chief wood used for ties, furnishes more than 44 per cent, nearly one-half of the whole number, while the southern pines, which rank second, contribute about one-sixth. Douglas fir and cedar, the next two, with approximately equal quantities, supply less than one-fifteenth apiece. Chestnut, cypress, western pine, tamarack, hemlock, and redwood are all of importance, but no one of them furnishes more than a small proportion.

Oak and southern pine stand highest in both total and average value; the average value of each is 51 cents. Chestnut ranks next, followed by cedar. Hemlock, at 28 cents, is the cheapest tie reported.

More than three-fourths of all ties are hewed; and with every wood from which ties are made, except Douglas fir and western pine, the number of hewed ties is greater than the number sawed. About ten times as many Douglas fir ties are sawed as are hewed. Of the oak ties a little over one-sixth and of the southern pine ties less than one-third are sawed. In general, when lumber has a relatively low value the proportion of sawed ties increases, because the market for ties is always active, while that for lumber is frequently sluggish. All western species are affected by this condition, for stumpage is abundant and its value relatively low.

About one-third of the ties used by street railroads are sawed, but not quite one-fourth of those used by steam roads. The greater proportion of sawed ties used by street lines is probably due to the fact that much of the trackage within city limits is on paved streets, where sawed ties are more satisfactory on account of their regular shape.

The average price of the sawed tie is, as a rule, higher than that of the hewed one, despite the fact that the hewed tie is more durable. This peculiar condition of an inferior commodity bringing a higher price is brought about by the difference in market conditions. Sawed ties, though admittedly less durable, represent a potential value equivalent to the amount of lumber into which they could be cut. Hewed ties, on the other hand, compete only with posts or fuel wood, both of which are of lower value.

CONSUMPTION IN 1905 AND IN 1906.

Table 3 shows the number and value of the different kinds of ties purchased by the steam and street railroad lines in the United States in 1906, and contrasts the purchases of steam railroad companies in 1905 and 1906. No statistics are available upon the purchases by street lines in 1905.

TABLE 3.—*Number and value of ties purchased by steam and street railroads in the United States in 1905 and 1906.*

	Steam railroads, 1905.			Steam railroads, 1906.			Street railroads, 1906.[a]		
	Number.	Value.	Average value per tie.	Number.	Value.	Average value per tie.	Number.	Value.	Average value per tie.
Oaks	34,677,304	$19,072,517	$0.55	41,532,629	$21,256,518	$0.51	3,825,245	$2,021,534	$0.53
Southern pines[b]	18,351,037	7,707,436	.42	17,538,090	8,905,009	.51	1,303,120	662,736	.51
Cedar	6,962,827	3,063,644	.44	6,416,867	3,044,446	.47	666,575	265,670	.40
Douglas fir	3,633,276	1,198,981	.33	6,706,222	2,782,967	.41	542,340	227,425	.42
Chestnut	4,717,604	2,264,450	.48	4,646,763	2,132,984	.46	1,942,212	862,958	.44
Cypress	3,483,746	1,149,636	.33	4,988 585	1,813,500	.36	115,911	48,635	.42
Western pine	(c)	....	....	3,909,500	1,673,359	.43	60,105	24,668	.41
Tamarack	3,060,082	1,101,630	.36	2,430,236	837,217	.34	146,623	52,344	.36
Hemlock	1,713,090	565,320	.33	2,037,002	576,896	.28	21,196	6,072	.29
Redwood	590,852	118,170	.20	725,346	248,844	.34	528,283	287,328	.55
Lodgepole pine	(c)	....	....	553,838	210,458	.38	900	360	.40
White pine	(c)	....	....	258,030	76,833	.30	115,357	74,219	.64
All others	791,409	343,662	.43	1,734,517	661,501	.38	93,550	64,643	.69
Total	77,981,227	36,585,446	.47	93,477,625	44,220,532	.47	9,356,417	4,598,592	.49

[a] No figures for street railroads in 1905.
[b] For 1905 includes white pine, lodgepole pine, and western pine.
[c] Included in southern pines.

The purchases of ties reported by the steam railroad companies in 1906 exceeded those of 1905 by more than 15,000,000. Nearly one-half of this excess was oak. The purchases of cedar ties showed a decrease of about one-half million, due possibly to the sharp demand for cedar poles, which operated against the production of ties. Douglas fir ties nearly doubled in quantity, and both cypress and hemlock increased by a large percentage, but tamarack purchases fell off more than one-fifth and chestnut about 1.5 per cent.

The street railways use about the same proportion of oak ties as the steam roads, a larger proportion of southern pine, cedar, chestnut, cypress, and hemlock, but a smaller proportion of Douglas fir, western pine, and tamarack. Comparing the consumption of ties by steam railroads and street railroads, there is practically no difference between the average values per tie for all kinds of timber combined, but the average costs per tie for the individual kinds of wood show some wide variations. These can not be attributed to any general condition, but are probably due to local influences which operate to increase or decrease the cost to users of certain kinds of ties in particular regions. Such local conditions in turn affect the general average for the kind of timber for the whole United States.

PRESERVATION.

The question of tie preservation is becoming more and more important as the demand for tie material increases and the traffic requirements become more exacting. So long as plenty of white oak ties could be secured the necessity for tie preservation was not felt; but with the constantly increasing use of pine and other less decay-resistant woods, it has become a vital economic question. The railroad companies have met the problem by establishing treating plants in various parts of the United States and by laying experimental tracks with treated ties to determine the efficiency of the several preservatives under varying conditions.

In 1906 the purchases of treated ties by steam and street railroad companies combined amounted to 5,289,435; in addition to this quantity, the companies treated 6,490,203 at their own plants, a total of 11,779,630 treated ties during the year, or 11.5 per cent of the whole number. Of this total the steam railroad companies purchased, during the year, 4,773,116 treated ties, and applied preservatives to 6,365,523 at their own plants. The street lines used 640,999 treated ties, 516,319 of them already prepared when they were bought, and 124,680 treated at their own plants.

Approved:

JAMES WILSON, *Secretary of Agriculture.*

WASHINGTON, D. C., *October 22, 1907.*

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